

CLAIMS

1. A touchpad comprising a supporting medium supporting a plurality of spaced apart conductors in which there is no electrical contact between
5 the conductors, each conductor being sensitive to the proximity of a finger to modify the capacitance of said conductor to detect the presence of said finger positioned close to that conductor, the touchpad further comprising a means to concentrate electric field between conductors towards the plane of the supporting medium.
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2. The touchpad as claimed in claim 1, wherein the means is an electrically conductive medium proximal to said conductors.
3. The touchpad as claimed in claim 1 or claim 2, wherein the means is
15 adapted to locally modify the capacitive environment between a subset of conductors.
4. The touchpad as claimed in any of claims 1 to 3, wherein the means is adapted to accentuate the variation in capacitance of a conductor and to
20 control the dispersion of a resulting capacitive signal propagating from substantially the proximity of said finger.
5. The touchpad as claimed in any preceding claim, wherein the supporting medium is electrically insulating.
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6. The touchpad as claimed in claim 2, wherein the conductive medium is in the form of a conductive layer covering at least a portion of the supporting medium .

7. The touchpad as claimed in claim 6, wherein the conductive layer is discontinuous.

8. The touchpad as claimed in claim 6 or claim 7, wherein the
5 conductive layer is supported by a first surface of the supporting medium or a first surface of a dielectric medium.

9. The touchpad as claimed in claim 8, wherein the dielectric medium has a thickness which is relatively large as compared to the thickness of the
10 conductive layer.

10. The touchpad as claimed in any of claims 6 to 9, further comprising a non-conductive layer proximate to the conductive layer.

11. The touchpad as claimed in any of claims 8 to 10, wherein the
15 supporting medium and conductive layer are separated by the dielectric medium.

12. The touchpad as claimed in any of claims 8 to 10, wherein the
20 conductive layer is sandwiched between the supporting medium and the dielectric medium.

13. The touchpad as claimed in any of claims 8 to 10, wherein the supporting medium is sandwiched between the conductive layer and the
25 dielectric medium.

14. The touchpad as claimed in any of claims 8 to 13, comprising a further conductive layer proximate to the dielectric medium and sandwiching the dielectric medium between the further conductive layer
30 and the conductive layer.

15. The touchpad as claimed in any of claims 2 to 14, wherein the conductive medium has a resistivity in the range of 100 ohms per square to 10,000,000 ohms per square.

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16. The touchpad as claimed in any of claims 2 to 15, wherein the conductive medium electrically floats or is grounded to earth.

17. The touchpad as claimed in claim 16, wherein the conductive
10 medium is grounded by a wire or resistor.

18. The touchpad as claimed in claim 6, wherein the conductive layer
comprises a plurality of electrically isolated conductive regions separated
by regions of the first surface of the supporting medium or first surface of
15 the dielectric medium.

19. The touchpad as claimed in claim 18, wherein the separations
between the conductive regions are relatively small compared to the width
of the conductive regions, so as to allow capacitive coupling of adjacent
20 regions via the supporting medium or the dielectric medium.

20. The touchpad as claimed in claim 14, wherein the further conductive
layer is supported by a second surface of the dielectric medium, the second
surface in substantially opposed relation to the first surface of the dielectric
25 medium.

21. The touchpad as claimed in claim 20, wherein the further conductive
layer comprises a plurality of electrically isolated conductive regions
separated by regions of the second surface of the dielectric medium.
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22. The touchpad as claimed in claim 21, wherein the conductive regions on the first surface of the dielectric and the conductive regions on the second surface of the dielectric are registered to each other by virtue of corresponding substantially coterminous areas.

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23. The touchpad as claimed in claim 21, wherein the conductive regions on the first surface of the dielectric and the conductive regions on the second surface of the dielectric are registered to each other by virtue of corresponding overlapping non-coterminous areas.

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24. The touchpad as claimed in claim 22 or claim 23, wherein the registered regions are capacitively coupled via the dielectric medium

25. The touchpad as claimed in any of claims 18 to 24, wherein the
15 conductive regions are substantially rectangular.

26. The touchpad as claimed in claim 8, wherein the conductive layer comprises a plurality of electrically isolated conductive regions separated by regions of the first surface of the supporting medium or the first surface
20 of the dielectric medium, each conductive region linked by one or more conductive bridges to adjacent conductive regions, the bridges having a width substantially smaller than the width of the conductive regions.

27. The touchpad as claimed in claim 26, wherein the conductive
25 regions have a relatively large thickness and the conductive bridges have a relatively small thickness to increase the resistance in the conductive layer.

28. The touchpad as claimed in claim 2, wherein the supporting medium and conductive medium are formed as a single conductive support and
30 sensing layer.

29. The touchpad as claimed in claim 28, wherein the single conductive support and sensing layer is formed from a bulk doped medium having a bulk conductivity.

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30. The touchpad as claimed in claim 29, wherein the bulk doped medium is glass or plastic comprising a dopant of conductive material.

31. The touchpad as claimed in claim 30, wherein the conductive material is particulate or fibrous.

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32. The touchpad as claimed in claim 31, wherein the particulates may be formed from metal or metal oxides with a size up to 10 microns wide.

33. The touchpad as claimed in claim 31 or claim 32, wherein the fibrous material may be formed from nanotubes or carbon fibres with a length up to 10 millimetres.

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34. The touchpad as claimed in claim 28, wherein the plurality of conductors are substantially contained within the single conductive support and sensing layer.

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35. The touchpad as claimed in any preceding claim, wherein the plurality of conductors are each electrically insulated.

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36. The touchpad as claimed in claim 35, wherein each conductor is coated with an electrically insulating sheath.

37. The touchpad as claimed in claim 28, wherein the conductive support and sensing layer has a textured surface in the form of surface distortions for the redirection of a point of touch.

5 38. The touchpad as claimed in any preceding claim, wherein the touchpad is arranged into a non-planar configuration.

39. The touchpad as claimed in any preceding claim, wherein the touchpad is resilient.

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40. The touchpad as claimed in claim 1 or claim 38, wherein the touchpad is deformable.

15 41. The touchpad as claimed in claim 2, wherein the conducting medium is Indium Tin Oxide (ITO) or Antimony Tin Oxide (ATO).

20 42. A touchpad system including a touchpad as in any preceding claim including a sensing circuit comprising a touch detector circuit and wake up circuit, the sensing circuit periodically sleeping and waking to measure the state of the touchpad, wherein in response to a touch, the sensing circuit wakes up, if sleeping, and scans the surface to determine the touch position.

43. The touchpad system as claimed in claim 42, wherein the touch is detected in less than about 3 microseconds.

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44. The touchpad system as claimed in claim 42 or claim 43, wherein the power consumption of the sensing circuit is less than about 10 micro-amps when sleeping.

45. The touchpad as claimed in claim 1 wherein the plurality of conductors comprises a first series of spaced-apart conductors and a second series of spaced apart conductors disposed in intersecting relation.